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ABSTRACT

In the past, students who knew only a little English (called limited English proficient, or LEP), were usually taught only low-level science and mathematics. Now, new science and mathematics teaching methods can help LEP students get a good education in both fields. This guide will help parents know if their children are learning as much as possible. A preschool curriculum should make connections between the children's present lives and the lives of their ancestors and should draw on experience with plants and animals and nutrition and health instruction. Elementary and high school science lets students see and feel the meaning of the words instead of just hearing descriptions. Science taught to LEP students should be the same as that taught to others, and examples from the students' cultures should be used to make science learning easier. Use of common themes and cultural awareness can make improving English an accompaniment to science instruction. Group work, the application of mathematics, and the use of computers can all help an integrated program that teaches students science, mathematics, and English together. (SLD)

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A GUIDE TO TEACHING ENGLISH AND SCIENCE TOGETHER

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All students need to know English and science to live a full life in the U.S., and to get a good job. Since students learn English best when it is taught along with other subjects, it is important for the science taught in all grades to also help students learn English.

In the past, students who knew only a little English (called Limited English Proficient, or LEP) were usually taught only low-level science and mathematics in the false belief that they could not learn more. Now, new science and math teaching methods and curricula can help LEP students get a good education in both science and English. This guide to these programs will help parents know if their children are learning as much science as they can.

Early Science and English Education

Preschool science that also includes teaching English can help young children get a good start in learning. The curriculum should make connections between children's present lives and the lives of their ancestors, and draw on their diverse cultures, so it is easier for them to understand.

Experience with Plant and Animal Life

Young children can learn by looking at, and playing with, animals and plants. They improve their native language and English as they talk and learn about how plants and animals look and behave. These experiences will help

them understand the more complicated ideas taught in later science instruction.

Nutrition and Health Instruction

Students learn about good nutrition and health, and get better eating habits, as they find out about the various diets of living things. For example, children find it interesting to look at all the types of sugars in nature (not only the kind used at home). Also, studying foods and their sources in nature teaches them what is good and bad about eating certain kinds of food.

K-12 Science and English Education

Elementary and high school science lets students see and feel the meaning of words instead of just hearing descriptions, so they can also learn English. As students learn more, the science gets more complex and the English more advanced.

Science

Science taught to LEP students should be the same as the science taught to other students, because science in all its forms affects everyone's life, and knowing science can help people have a more interesting and better paying career.

Examples from the cultures of LEP students should be used to make science learning easier. The way science affects everyday life should also be pointed out. Explaining how water gets into faucets and how heat gets into radiators are two examples. Using students' own diets to explain the food chain and talking about agriculture in their native countries also help learning. Students should use examples from their lives as a way of sharing information with students from different backgrounds and learning to communicate in English at the same time.

Science instruction should be organized around common themes, such as the weather. Themes can be social issues, such as the pollution and purification of water, or the different ways that drugs affect living things. Doing this makes science more understandable and personal, can help young people make better choices about their behavior, and makes it more likely that students will continue to want to learn science and language on their own.

Teachers should also point out scientists from many cultures whose work was very important to the U.S., so students will admire the success of people of many different backgrounds, and have role models for their future careers.

English

Teachers should give students hands-on experience with science materials while the whole class is working together (called "cooperative learning") so they can also learn English together. They should give students several books, rather than one textbook, so they can compare them and increase their Eng-

lish vocabulary by reading many types of writing.

In science lessons, teachers should first explain the English terms or names, using English words that the students can understand. They can also write the names on stickers and put them on science materials. They should follow up by asking students to repeat the lesson aloud in their own words, and then write about it.

Thinking and Communication

Science lessons should teach students to think and figure things out as well as give them facts. To learn to solve problems, and to improve their English, students should work in groups. Each group should have its own project, with questions and answers, and each student should have a task. When a group begins a new project, each students should get a new task. This way of teaching makes students part of the lesson. When lessons consist of only a teacher talking and students listening or taking notes, students may not understand what is being taught, may lose interest, and probably won't learn as much.

Mathematics and Computers

The science problems that students solve should make them use mathematics, so they will learn more math and understand why it is important to their lives.

Computers can also help students solve science problems. Science lessons using special computer programs can help them learn about science topics that can't be brought right into the classroom, and teach them more skills that they will need in the work world.

This guide, by Wendy Schwartz, is based on **Teaching Science Effectively to Limited English Proficient Students**, *a digest published by the ERIC Clearinghouse on Urban Education. Please send a stamped, self-addressed envelope to the Clearinghouse for a copy of the digest and a list of other Clearinghouse publications.*

Other guides to help parents help their children learn can be found on the National Parent Information Network (NPIN) on the Internet. You can reach the NPIN World Wide Web at http://ericps.ed.uiuc, or the NPIN Gopher at gopher://ericps.ed.uiuc.edu. Ask someone in your local library, your children's school, or your parent center how to see the information on this network.

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